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Receipt of the following application papers is evidenced hereon by the Official Stamp of the U.S. Patent & Trademark Office:

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The undersigned hereby revokes the outstanding Power of Attorney and elects to prosecute **Pro Se** in the above-identified patent application.

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N. SUTURE NUT - a banded split-nut having an internal friction surface instead of threads and a relatively non-elastomeric band that engages the surface of the sections of the split-nut.

FIGURE 118 depicts a top plan view of the ring of the suture nut.

FIGURE 119 depicts a top plan view of the suture nut comprising two nut sections and the ring of FIG. 118.

FIGURE 120 depicts a side elevation view of the suture nut of FIG. 119 except that the ring, which has a graded inner and optionally outer diameter, is disposed on a lower of two longitudinal sections of the split-nut. The longitudinal sections have a graded outer diameter such that the larger diameter portion of the lower section abuts the smaller diameter portion of the upper section. Overall, the upper section has a larger diameter than the lower section.

FIGURE 121 depicts the assembly of FIG. 120 except that the ring is shown in section along line w-w of FIG. 119 and the two halves of the split-nut are spaced from one another as they loosely a suture.

FIGURE 122 depicts a sectional front elevation view along line y-y of the assembly of FIG. 119.

FIGURE 123 depicts another sectional view of the suture nut.

FIGURE 124 depicts the assembly of FIG. 120 wherein the ring is being moved longitudinally from the lower longitudinal portion of split-nut toward its upper longitudinal portion.

FIGURE 125 depicts the assembly of FIG. 124 except that the ring has been moved even further up.

FIGURE 126 depicts a partial sectional view of the assembly of FIG. 125.

FIGURE 127 depicts the assembly of FIG. 126 except that the ring has been moved even further up.

FIGURE 128 depicts a side elevation view of the assembly of FIG. 127.

FIGURE 129 depicts the assembly of FIG. 128 except that the ring is now fully engaged with the upper longitudinal larger diameter section of the split-nut such that

the halves of the split-nut are in contact with one another and the split-nut engages the suture tightly.

FIGURE 130 depicts a partial sectional side view of the assembly of FIG. 129.

FIGURE 131 depicts a top plan view of the assembly of FIG. 129.

<u>"FIGURE 30' is a side view of a modified split nut and snap ring assembly being used as a suture nut. The halves of the split nut are separated.</u>

<u>FIGURE 31' is a side view of the suture nut of FIG. 30', wherein the snap ring is engaged more tightly with the split nut thereby forcing its halves together."</u>

<u>FIGURE 32' is a bottom plan view of the assembly of FIG. 30'.</u>

<u>FIGURE 33' is a bottom plan view of the assembly of FIG. 31'.</u>

<u>FIGURE 34' is a cross-sectional perspective view of the snap ring of FIGS. 30'-33'.</u>

<u>FIGURES 35'-37' are perspective views of a suture nut in operation."</u>

O. TRANSVERSE IMPACTION SCREW – wherein the screw comprises a flat surface on a rod such that when the rod is rotated about its linear axis a change in the position of a tissue engaged with the rod is affected.

FIGURE 132 depicts a top plan view of the transverse impaction screw along lines H-H of FIG. 133.

FIGURE 133 depicts a side elevation view of a transverse impaction screw having a flat rod portion, a tool-engaging means at one end and a threaded shaft portion interposed the flat rod portion and the tool-engaging means.

FIGURE 134 depicts a partial front elevation view of the screw of FIG. 133 along lines J-J.

FIGURE 135 depicts a rear elevation view of the screw along lines G-G of FIG. 133.

FIGURE 136 depicts a partial sectional front view of the transverse impaction screw as installed in a bone such that the flat rod portion of the screw is disposed within a bore in the bone (shown in section) and engaged with a biological tissue, such as a ligament or tendon.

Split Suture Nut - Figures 118-131 <u>and 30'-37'</u>.

The split-nut of the invention can be used as a suture nut. In this embodiment, the split-nut is used for a non-threaded shaft, a suture, particularly in securing the suture S depicted in figure 120. The suture nut includes a band B and two split-nut sections c1 and c2. The band encircles and retains the sections C1 and C2. Figure 118 depicts the band B that is used to compress the section C1 and C2 of the split suture nut SSN. Figure 119 depicts the suture nut SSN with the band B surrounding the sections C1 and C2, and the suture s in the center. The sections C1 and C2 define a bore H around the suture S that serves to clamp the suture S when the sections C1 and C2 compressed together.

Figure 120 depicts the split suture nut SSN engaged with the lower longitudinal portion of the split suture n. The upper and lower longitudinal portions of the split nut include graded diameters, ramped surfaces. The upper ramped surface R1 of the split suture nut SSN engages the band B when the suture nut is compressed and the lower ramped surface R2 (shown in Figure 121) engages the band B when the sections of the suture nut are spaced apart.

In figure 121, the split suture nut SSN is depicted in partial section. The lower ramped surface R2 has an overall narrower diameter than the upper ramped surface R1, so that when the band B is around the Split Suture Nut SSN at the lower Ramp R2, the sections C1 and C2 are not compressed against the suture S. In the orientation of Figure 121, the split suture nut SSN is able to slide along the suture S forward and backward.

In figure 122, the band B in cross section and sections C1 and C2 in cross section, taken along lines Y-Y of figure 119. This figures shows that each section C1 and C2 is of unitary construction even though each section C1 and C2 has its own respective ramped surfaces. The ramped surfaces R1 and R2 are separated by the ledge L where the Band B reside when it is around the upper ramped surface R1.

Once the Suture Split-nut SSN is in place, the band is moved from the surface R1 to the surface R1 to cause the sections C1, C2, to clamp the suture S. In figure 123, the band B is shown approaching the ramped surface R1. This brings the sections C1 and C2 toward each other so that the hole H is narrower and almost clamping the suture S. This same position of the band is depicted in figure 124.

In figures 125 and 126, the band B has been moved even further along the lower ramped surface R2 upwardly toward the upper ramped surface R1. In figures 127 and 128, the bottom of the band is almost to the top of the ramped surface R2 and in proximity of the ledge L. In figures 129, 130 and 131, the band is fully engaged with the upper ramped surface R1 and held in place, generally irreversibly, by the ledge L. The band B holds the sections C1 and C2 together so that the friction surface H comes to bear on the suture S and hold the split suture nut SSN securely on the suture.

Although not shown, the sections C1 and C2 of the split nut can comprises even more ramped surfaces and ledges forming an overall stepped or ratcheting outer surface. Likewise, the band can comprise inner ramped surfaces that mate with the ramped surfaces of the split-nut.

The suture nut provides a very efficient method for applying fixation force to suture as its sections are fully cut longitudinally so they apply pressure their entire length. This device installs in small areas as it can be installed with a tube-within-a-tube instrument with one tube stabilizing the two sections, C1 and C2 while the other tube is used to pull the band, B, along the Ramp R2 until in place in Ramp R1. This double tube tool reaches the Split Suture Nut SSN along the suture, S, so that it can insert through a tiny incision that the Suture, S enters.

Crimping tools that are used in clamping a conventional fastener (not of the invention) around cable such as around bales of hay, require access to the Crimping tool be manipulated by one's hand from the side of the cable. Such crimping fasteners cannot install in small areas such as those allowed in surgery. The Suture Nut can install in small areas, where tools only of small diameter can be applied to manipulate the band, B, to move on the sections, C1 and C2, to clamp the suture, S.

The suture nut provides a very efficient method for applying compressive and fixating force by its button shape on the suture. The suture nut presses against the surrounding tissue surface. Since the suture nuts sections are fully cut longitudinally, they transmit the pressure of the encircling band relatively evenly along their entire length with their interface along the suture. As it is preferably made from relatively non-deforming bioabsorbable materials, the suture nuts sections transmit the full force of the encircling band to the suture, making the Suture Nut a strong fastener. The Suture Nut can be installed through small laparoscopic incisions and placed in small areas of the body using fine instrumentation. It saves operating room time as the

Suture Nut installs much faster on the sutures than it takes to tie a knot in suture. Further, the Suture Nuts position against the tissue can be gauged much more precisely than suture knots.

FIG. 30' depicts a suture nut assembly (58'). The suture nut assembly comprises two partial nut sections (58a', 58b') and a snap ring (60'). The suture nut includes a bore (58c') that is generally not threaded. Moreover, the surfaces that define the bore (58c') at the inside of the suture nut are friction surfaces that are designed to grasp suture material.

The suture nut is generally used as follows. The band (60') is engaged with the lower groove (59a') such that the sections (58a', 58b') are adjacent yet spaced from one another. A suture (61') is placed within the bore (58c') and the Suture Nut is slid along the suture until it sits against the tissue that is to be secured. The snap ring is slid from the lower groove (59a') to the upper groove (59b'), thereby causing the sections (58a', 58b') to clamp the suture (61').

FIGS. 35'-37' depict a suture nut as it is generally used to facilitate closure of an incision in a body tissue. A suture nut (58') is clamped onto a first end of the suture (61'), which has a needle (63') at its second end. The needle and suture are threaded through the tissue adjacent an incision (62') in any manner used by a surgeon. The suture is pulled so that the suture nut abuts the tissue surface. The surgeon then continues to stitch the tissue to close the incision. Once the final stitch is made, the suture is tightened to close the incision and the second suture nut (64') is clamped onto the portion of the suture that is just exterior to the skin and is part of the last stitch. The suture is then cut to size, and the excess suture and attached needle are removed.

In an alternate embodiment, the suture nut includes a single enlarged bore, or a pair of small bores, adapted to receive two suture ends. In this embodiment, a single suture nut can be used to grasp two different portions of a suture simultaneously. The paired holes can be separated as desired. Alternatively, the single enlarged hole can be oval or otherwise shaped to simultaneously accommodate two suture portions within it.

The Suture Nut is preferably constructed from one or more of the combinations of polymers used in dissolvable implants, some of which were noted above that can be made to dissolve more rapidly when in contact with a catalytic agent.